

Claims:

1. A parking barrier apparatus for controlling the access of a vehicle past a barrier comprising:
 - 5 a barrier movable between a first barrier position allowing transit of the vehicle past said barrier, a second barrier position to which said barrier is moved by the passage of the vehicle over said barrier, and a third barrier position impeding movement of the vehicle past said barrier, said first barrier position being intermediate said second and third barrier positions;
 - 10 a locking mechanism selectively locking said barrier in said second barrier position and said third barrier position; and
 - a motive assembly having an energy storage device which stores energy to eventually move said barrier from said second barrier position to said third barrier position when said barrier is unlocked from said
 - 15 second barrier position.
2. A parking barrier apparatus according to claim 1 wherein said energy storage device stores mechanical energy.
- 20 3. A parking barrier apparatus according to claim 2 wherein said energy storage device includes a spring.
4. A parking barrier apparatus according to claim 3 wherein said spring is energized by the weight of the vehicle moving over said barrier causing said

barrier to move from said first barrier position to said second barrier position.

5. A parking barrier apparatus according to claim 4 wherein said motive assembly is within a housing having a base and said spring includes a first
5 spring end and a second spring end, both ends of said spring capable of moving relative to said base.

6. A parking barrier apparatus according to claim 5 wherein said barrier is operatively connected to a rotatable shaft and rotation of said shaft moves
10 said barrier.

7. A parking barrier apparatus according to claim 6 wherein said spring is mounted on a platform movable with respect to said base.

15 8. A parking barrier apparatus according to claim 7 wherein said platform moves toward said shaft as said barrier is moved from said first barrier position to said second barrier position.

9. A parking barrier apparatus according to claim 8 wherein as said
20 platform moves toward said shaft said spring is substantially compressed.

10. A parking barrier apparatus according to claim 7 wherein said motive assembly further includes a mechanical gain amplifier for amplifying movement of said shaft into movement of said platform.

11. A parking barrier apparatus according to claim 10 wherein said mechanical gain amplifier includes an arm attached to said shaft and a riding surface attached to said platform for translating rotatable motion of said shaft
5 into linear motion of said platform.

12. A parking barrier apparatus according to claim 11 wherein said arm is operatively attached to said rotatable shaft and said arm has a degree of freedom of movement relative to said shaft over a predetermined rotation of
10 said shaft.

13. A parking barrier apparatus according to claim 5 wherein said spring includes a damper which dampens movement of said barrier as said barrier is moved from said second barrier position to said third barrier position.

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14. A parking barrier apparatus according to claim 13 wherein said spring is a gas spring.

15. A parking barrier apparatus according to claim 6 wherein said locking
20 mechanism includes a shaft locking mechanism for selectively locking said shaft to prevent rotation of said shaft in one direction.

16. A parking barrier apparatus according to claim 15 wherein said shaft locking mechanism includes a latch lock which self-latches once said shaft

reaches a locking position.

17. A parking barrier apparatus according to claim 16 wherein said locking mechanism further includes a motor controlling operation of said latch lock.

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18. A parking barrier apparatus according to claim 17 wherein said locking mechanism further includes a gearing assembly movable by said motor to unlock said latch lock.

10 19. A parking barrier apparatus according to claim 18 wherein said locking mechanism is remote controlled.

20. A parking barrier apparatus according to claim 7 wherein said locking mechanism includes a platform locking mechanism selectively locking said
15 platform to prevent movement of said platform in one direction relative to said base.

21. A parking barrier apparatus according to claim 20 wherein said platform locking mechanism includes a latch lock which self-latches once said platform
20 reaches a locking position.

22. A parking barrier apparatus according to claim 21 wherein said locking mechanism further includes a motor for controlling said latch lock.

23. A parking barrier apparatus according to claim 22 wherein said locking mechanism further includes a gearing assembly movable by said motor which selectively unlocks said latch lock.

5 24. A parking barrier apparatus according to claim 23 wherein said locking mechanism is remote controlled.

25. A parking barrier apparatus for controlling the access of a vehicle past a barrier comprising:

10 a barrier movable between a horizontal position allowing transit of the vehicle thereover, a lower ramp position also allowing transit of the vehicle thereover, and a vertical position preventing transit of the vehicle thereover, said barrier being adapted to move from said horizontal position to said ramp position by the weight of the vehicle passing thereover;

15 a housing having a base;

a shaft operatively connected to and moving said barrier;

a locking mechanism for selectively locking said shaft with said barrier in said ramp position or with said barrier in said vertical position; and

a motive assembly for moving said shaft including a spring
20 having a first end and a second end, said spring as said barrier is moved from said horizontal position to said ramp position under the weight of the vehicle moving thereover storing sufficient mechanical energy subsequently to move said barrier from said ramp position to said vertical position, neither of said ends of said spring being permanently anchored to said base.

26. A parking barrier apparatus according to claim 25 wherein said spring is mounted on a platform movable with respect to said base.

5 27. A parking barrier apparatus according to claim 26 wherein said platform moves toward said shaft as the barrier is moved from said horizontal position to said ramp position, said movement substantially compressing said spring.

28. A parking barrier apparatus according to claim 27 wherein said motive
10 assembly further includes a mechanical gain amplifier for amplifying movement of said shaft into movement of said platform.

29. A parking barrier apparatus according to claim 28 wherein said mechanical gain amplifier includes an arm attached to said shaft and a riding
15 surface attached to said platform for translating rotatable motion of said shaft into linear motion of said platform.

30. A parking barrier apparatus according to claim 29 wherein locking mechanism prevents movement of said shaft in at least one direction and
20 prevents movement of said platform when said barrier is in said vertical position.

31. A parking barrier apparatus according to claim 30 wherein said locking mechanism includes latch locks for each of said shaft and said platform.

32. A parking barrier apparatus according to claim 31 wherein said locking mechanism further includes a motor operable to selectively release said latch locks.

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33. A parking barrier apparatus according to claim 32 wherein said locking mechanism further includes a controller for controlling operation of said motor.

34. A parking barrier apparatus according to claim 29 wherein said spring
10 is a gas spring.

35. A parking barrier apparatus according to claim 34 wherein said gas spring dampens movement as said barrier is moved from said ramp position to said vertical position.

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36. A method for sequencing movement of a parking barrier, the barrier having a vertical vehicle impede position, a non-impede horizontal position and a lower non-impede ramp position, comprising the steps of:

locking said barrier in said vertical position against a bias force
20 which would otherwise move said barrier;

unlocking said barrier so that said barrier moves under the influence of said barrier force to said horizontal position;

maintaining said barrier in said horizontal position until sufficient force is applied to said barrier to move it to said ramp position;

energizing a spring as said barrier is moved from said horizontal position to said ramp position;

providing sufficient energy in said spring to eventually enable said spring to move said barrier from said ramp position to said vertical

5 position against the action of said bias force;

locking said barrier in said ramp position with said spring energized until it is desired to move said barrier from said ramp position to said vertical position; and

unlocking said barrier from said ramp position to allow it to move
10 to said vertical position.

37. A method according to claim 36 wherein said spring is energized by the weight of a vehicle as the vehicle moves the barrier from said horizontal position to said ramp position.

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38. A method according to claim 37 further comprising the step of providing a command signal to unlock said barrier from said vertical position.

39. A method according to claim 38 further comprising the step of providing
20 a command signal to unlock said barrier from said ramp position.

40. A method according to claim 37 further comprising the steps of providing control signals from a remote controller to unlock said barrier from said vertical position and from said ramp position.

41. A method for sequencing movement of a parking barrier, the barrier having a vertical vehicle impede position, a non-impede horizontal position and a lower non-impede ramp position, comprising the steps of:

- 5 locking said barrier in said vertical position against a bias force which would otherwise move said barrier;
- unlocking said barrier so that said barrier moves under the influence of said barrier force to said horizontal position;
- maintaining said barrier in said horizontal position until sufficient
- 10 force is applied to said barrier to move it to said ramp position;
- energizing an energy storage device as said barrier is moved from said horizontal position to said ramp position;
- providing sufficient energy in said energy storage device to eventually enable said device to move said barrier from said ramp position to
- 15 said vertical position against the action of said bias force;
- locking said barrier in said ramp position with said energy storage device energized until it is desired to move said barrier from said ramp position to said vertical position; and
- unlocking said barrier from said ramp position to allow it to move
- 20 to said vertical position.

42. A method according to claim 41 wherein said energy storage device is energized by the weight of a vehicle as the vehicle moves the barrier from said horizontal position to said ramp position.

43. A method according to claim 42 further comprising the step of providing a command signal to unlock said barrier from said vertical position.

5 44. A method according to claim 43 further comprising the step of providing a command signal to unlock said barrier from said ramp position.

45. A method according to claim 42 further comprising the steps of providing control signals from a remote controller to unlock said barrier from
10 said vertical position and from said ramp position.